Volume III : The Fragile Web (approx. 200,000 words)
Dedicated to all the Flora and Fauna.

Preface:
This is a forensic audit of an impending extinction. We are documenting the heartbeat of Great Nicobar before the ₹72,000 crore Holistic Development plan silences it forever. The logic of the metropole is simple: cargo, containers, and strategic depth. The logic of the island is older: tides, tectonic shifts, and the precise temperature required for a turtle egg to hatch.

The project proposes an International Transshipment Port at Galathea Bay, a greenfield international airport, a gas and solar power plant, and a new coastal city. To achieve this, the state will authorize the felling of 9.64 Lakh trees. This is not just a number on a ledger. It represents the removal of 130 square kilometers of primary rainforest, some of the most carbon-dense vegetation on the planet. This volume will dismantle the myth that this can be compensated for by planting saplings in the arid landscapes of Haryana or Rajasthan. An ancient tropical ecosystem is not a Lego set that can be moved.

We begin with the *Dermochelys coriacea*, the Leatherback Sea Turtle. It is a relic of the Cretaceous period. Unlike other sea turtles, it lacks a hard shell. Its back is a mosaic of small bones covered by a thick, rubbery skin. In the cold depths of the Indian Ocean, it can dive up to 1,200 meters. But it must return to the land to breathe life into the next generation. Galathea Bay is its primary sanctuary in the South Asian region. The sand here has a specific grain size and mineral composition that facilitates the exact gas exchange needed by the developing embryos.

When the construction of the transshipment port begins, the dredging will suffocate the coral and the seagrass. The artificial lights from the port will disorient the tortoise hatchlings. They will crawl toward the concrete instead of the moonlit sea, a fatal detour. The light pollution alone is sufficient to terminate the reproductive cycle of the species at its most critical Indian site.

Next is the Nicobar Megapode, or *Megapodius nicobariensis*. Locally known as the Gunghee, this bird does not sit on its eggs. It is an engineer of the forest floor. It builds massive mounds of sand, leaf litter, and organic debris. The fermentation of this vegetation provides the heat necessary for incubation. The Megapode monitors the temperature with its beak, adding or removing material to maintain a steady 33 degrees Celsius. These mounds are situated in the coastal forests, precisely where the airport and the township are planned. To clear these forests is to bury the Megapode’s future under a layer of bitumen.

The Shompen tribe, numbering fewer than 300 individuals, are the guardians of these forests. They are a Particularly Vulnerable Tribal Group with almost no immunity to common mainland diseases. The influx of an estimated 1.5 lakh people, including laborers and settlers, is a biological threat. History in the Great Andamanese and the Onge shows us that contact is often

synonymous with collapse. This project is a geographic reshuffling that ignores the human cost of displacement.

CHAPTER 1: THE BIO-GEOGRAPHY OF GREAT NICOBAR

Great Nicobar is the largest and southernmost of the Nicobar Islands. It is located just 145 kilometers north of Sumatra. It is a place of high rainfall, reaching 3,800 mm annually. This rain feeds the five perennial rivers: Galathea, Alexandra, Dogmar, Amrit Kaur, and Jubliee. These rivers are the arteries of the island, carrying nutrients from the hills to the sea. The proposed project intends to dam and divert these flows for industrial and residential use, forever altering the salinity of the estuaries where the saltwater crocodiles breed.

The island is a hotspot for endemism. This means the species found here exist nowhere else. The Nicobar long-tailed macaque (*Macaca fascicularis umbrosa*) is a prime example. These primates live in social groups that utilize the coastal vegetation. Experts warn that the project stands to wreck the ecosystem of this endemic macaque population: 70% of their social groups may lose their territories. When a social animal loses its territory, it doesn't just move to the next tree. It enters into conflict with other groups, leading to a cascade of population decline.

THE MATHEMATICS OF HABITAT LOSS

To understand the scale, we must look at the specific forest types. The project area encompasses:

1. Tropical Evergreen Forest: The dense canopy that houses the Nicobar Tree Shrew.
2. Littoral Forest: The frontline defense against tsunamis, now slated for port infrastructure.
3. Mangrove Forest: The nurseries for the fish that sustain the Shompen and the Nicobarese.

The diversion of 166.1 square kilometers of forest land is the largest single forest diversion in India’s recent history. The Environmental Impact Assessment report remains a document of evasion. It minimizes the presence of the Nicobar Megapode mounds and ignores the migration paths of the Leatherback. We are choosing a transshipment port over a 100-million-year-old biological legacy. We are choosing cargo over the Gunghee.

The following sections will provide a detailed, species-by-species analysis of what we are about to lose. This is the ledger of the ignored. This is the raw data of the wild.

THE LEDGER OF THE IGNORED: SPECIES ACCOUNTABILITY

AVIAN WONDERS: ENDEMISM IN THE CANOPY

Andaman Serpent-Eagle (Spilornis elgini)

The Andaman Serpent-Eagle stands as a silent sentinel of the inland tropical evergreen forests. It is a medium sized raptor. Dark. Somber. Its plumage is a deep chocolate brown, almost

appearing black under the heavy shadow of the Dipterocarpus canopy. Upon closer inspection, the feathers reveal a complex arrangement of small white spots. These ocelli are most prominent on the underparts and the wing coverts. Its eyes are a piercing, pale yellow. The lores are bare. The skin there is a bright, sulfurous yellow. This contrast against the dark feathers is startling. It is a specialist of the interior. Unlike the Crested Serpent-Eagle found on the mainland, *Spilornis elgini* avoids the open coast. It prefers the damp, humid stillness of the primary forest.

The hunt is a display of patience. The eagle perches on a low branch, often below the main canopy. It stays motionless for hours. It watches the forest floor. The prey consists mainly of reptiles. Snakes. Tree lizards. Calotes. Sometimes a rat or a large beetle. When the strike happens, it is sudden. A heavy, downward lunge. The talons are thick and powerful. They are designed to crush the vertebrae of serpents instantly. The bird does not soar often. It moves with short, heavy wingbeats between perches. Its flight is direct. Purposeful. The sound of its wings is a dry rustle against the humid air.

The call of the Andaman Serpent-Eagle defines the auditory landscape of the islands. It is a high pitched whistle. A series of notes: *kee-kee-kee-kee-yee*. The final note rises in pitch and intensity. It carries across the valleys of North Andaman and Middle Andaman. It is the sound of territorial dominance. In the early morning, when the mist clings to the Mahua trees, these calls echo from the ridges of Saddle Peak. The nesting behavior is poorly documented but follows a predictable pattern of isolation. Nests are bulky platforms of sticks. They are placed high in the forks of tall forest trees, often hidden by epiphytic ferns and orchids.

Conservation of this species is tied to the integrity of the primary forest. It is listed as Near Threatened. Habitat fragmentation is the primary enemy. When the tall trees fall, the eagle loses its hunting ground. It cannot adapt to the scrubland or the plantations. It requires the old growth. It needs the specific microclimate of the deep woods. The smell of rotting leaf litter and damp bark is its home. To see one in the wild is to see a relic of an isolated evolutionary path. It is a bird that has refined its existence to fit a single, emerald archipelago.

Andaman Crake (Rallina canningi)

The Andaman Crake is a ghost of the marshy forest floor. It belongs to the family Rallidae. It is perhaps the most beautiful crake in the world. Its body is a rich, saturated chestnut red. The color is deep. It looks like polished mahogany. The wings and underparts are marked with bold, black and white bars. This patterning is sharp. Precise. It provides perfect camouflage among the dappled light and shadows of the wet leaf litter. Its legs are long and olive green. The toes are slender, built for navigating the soft, muddy edges of forest streams. The bill is a pale, greenish yellow. It stands out against the dark face.

The habitat of the Andaman Crake is specific. It requires shade. It needs moisture. You will find it near perennial freshwater streams or in the vicinity of marshy depressions within the evergreen forests. It is a shy bird. Crepuscular. Most active at dawn and dusk. It moves with a

high stepping gait. Its tail flicks constantly. A nervous habit. It probes the soft earth for earthworms. It flips over dead leaves to find snails and small insects. The bird is a terrestrial specialist. It rarely flies. When startled, it prefers to run. It vanishes into the dense undergrowth of cane brakes and bamboo thickets with incredible speed.

Communication is through a series of low, rhythmic calls. A deep *k-r-r-r-a-k*. This is repeated at intervals. In the stillness of the Baratang mangroves or the interior of Little Andaman, the sound is unmistakable. It is a primal vibration. During the breeding season, which coincides with the onset of the Southwest Monsoon in June, the birds become more vocal. They are territorial. The nest is a simple cup of grass and dry leaves. It is usually placed on the ground, tucked between the buttress roots of a large tree or hidden under a fallen log. The eggs are creamy white with reddish brown spots.

The survival of the Andaman Crake is precarious. It is endemic to the Andaman group. It is absent from the Nicobars. The introduction of feral cats and dogs is a major threat. Predation on the ground is a constant risk. Furthermore, the draining of wetlands for agriculture destroys its foraging grounds. The bird represents the fragile link between the terrestrial forest and the freshwater systems of the islands. It is a specialist of the shadows. A creature that reminds us that the most significant life forms are often the ones that refuse to be seen.

Andaman Scops Owl (Otus balli)

The Andaman Scops Owl is a master of nocturnal concealment. It is a small owl. Compact. It exists in two distinct color morphs. One is a warm, rufous brown. The other is a cooler, greyish brown. Both are intricately vermiculated. Fine lines of black and white cover the feathers, mimicking the texture of tree bark. The ear tufts are small. They are often held flat. The most striking feature is the eyes. They are a brilliant, unblinking yellow. They capture the faint starlight filtering through the canopy of the padauk trees.

This owl is endemic to the Andaman Islands. It is common but frequently overlooked. It inhabits both primary forests and the edges of secondary growth. It is even found in the old gardens and coconut groves near Port Blair. It is a generalist of the night. Its diet consists almost entirely of insects. Large moths. Beetles. Cicadas. It hunts from a perch. It sits still, turning its head with mechanical precision. When it detects movement, it drops silently onto the prey. The flight is buoyant. Muffled. The leading edges of its feathers are soft, eliminating the whistle of the air.

The song of the Andaman Scops Owl is a characteristic part of the island night. It is a short, hollow whistle. *Kwopp*. It is repeated every few seconds. It sounds like a large drop of water falling into a deep pool. The frequency is steady. Rhythmic. On a quiet night in Havelock or Neil Island, these calls form a background pulse. It is a territorial signal. It tells other owls that this specific patch of forest is occupied. Nesting occurs in the hollows of dead trees. These cavities are often the abandoned holes of woodpeckers or barbets. No nesting material is added. The eggs are laid directly on the wood dust at the bottom of the hole.

Despite its current status as Least Concern, the Andaman Scops Owl is vulnerable to the loss of old, hollow trees. Modern forestry often removes dead wood. This leaves the owl homeless. The bird is a vital nocturnal insectivore. It keeps the population of forest beetles in check. It is an essential component of the island's trophic web. To hear its call is to know that the forest is awake. It is a small, feathered heartbeat in the darkness.

Narcondam Hornbill (Rhyticeros narcondami)

The Narcondam Hornbill is a miracle of island biogeography. It is found on a single island. Narcondam. A volcanic rock rising from the Andaman Sea. The entire global population lives on less than seven square kilometers. It is a small hornbill. The male has a rufous head and neck. The body is black. The tail is white. The female is entirely black, except for the white tail. Both have a pale bill with a small, serrated casque. Their presence on such a small, isolated island is a testament to the resilience of the species.

The island is a rugged heap of volcanic stone covered in dense forest. The hornbills are everywhere. They are the dominant fruit eaters. They feed on the fruits of Ficus and other tropical trees. They are the primary seed dispersers for the island. Without them, the forest on Narcondam would wither. They move in small groups. Their flight is heavy. The sound of their wings is a loud, rhythmic whooshing. *Woosh-woosh-woosh*. It is audible from a distance. It is caused by the lack of underwing coverts, which allows air to rush through the flight feathers.

Breeding is a communal affair on the island. The birds nest in the hollows of tall trees, particularly the *Spondias pinnata*. The female is sealed into the nesting cavity using a mixture of mud and droppings. Only a small slit remains. The male spends his days bringing her food. He regurgitates fruits through the slit. She stays inside for months, molting and raising the chick. It is a high stakes strategy. If the male dies, the female and chick starve. This behavior evolved in an environment where natural predators were few.

The Narcondam Hornbill is Vulnerable. Its range is the smallest of any hornbill in the world. Any major disturbance could be catastrophic. A volcanic eruption. A severe cyclone. The introduction of an invasive predator like a rat or a snake. The Indian Coast Guard and the Ministry of Environment maintain a strict watch on the island. Human presence is limited to a small police outpost. The hornbills have learned to coexist with them, often hopping on the roofs of the huts. They are the kings of their tiny, volcanic realm. They represent the ultimate extreme of endemism.

Andaman Woodpecker (Dryocopus hodgei)

The Andaman Woodpecker is the largest woodpecker in the islands. It is a member of the genus *Dryocopus*. It is a cousin of the great Black Woodpecker of Eurasia. Its plumage is a slatey black. Deep. Uniform. The male has a vibrant, crimson crown and a red malar stripe. The female lacks the red on the face, possessing only the crimson crest. The bill is long, ivory-white,

and incredibly strong. It is a specialized tool. A chisel designed for the heavy hardwoods of the Andaman jungle.

This bird is a denizen of the tall, primary evergreen forests. It requires large, old-growth trees. It is often found on the trunks of massive Padauk or Gurjan trees. It is an active forager. You will hear it before you see it. The drumming is powerful. A loud, rapid-fire burst: *rat-at-at-at-at*. It echoes through the forest like a hammer on a hollow pipe. This drumming is a communication tool. It advertises territory and attracts mates. It also serves a practical purpose. The woodpecker uses its bill to strip away bark and excavate deep into the wood. It is looking for wood-boring beetle larvae.

The flight of the Andaman Woodpecker is undulating. Heavy wingbeats followed by a short glide. As it flies, it often gives a loud, piercing call. A sharp *chiank*. It is a bold bird. It does not hide. It dominates the vertical space of the forest. The nesting behavior involves excavating a large hole in a dead or dying tree. These holes are often several meters above the ground. The excavation process takes weeks. These cavities are vital for the forest ecosystem. Once the woodpeckers are finished, the holes become homes for owls, parakeets, and even small mammals.

The species is listed as Vulnerable. It is highly sensitive to logging. The removal of large, old trees directly impacts its ability to forage and nest. It cannot survive in plantations of rubber or teak. It needs the complexity of the natural forest. The Andaman Woodpecker is an architect. It shapes the forest. It creates niches for other species. Its disappearance would trigger a cascade of failures in the avian community. It is the heavy laborer of the Andaman canopy.

Andaman Drongo (Dicrurus andamanensis)

The Andaman Drongo is the dark acrobat of the forest edge. It is entirely black. Its feathers have a subtle blue or green iridescence when the sunlight hits them at the right angle. The most defining feature is the tail. It is long and deeply forked. The outer feathers curve outward. This allows for incredible maneuverability in the air. The bill is heavy and slightly hooked at the tip. The eyes are a deep, dark red. It is a bird of character. Bold. Aggressive. Highly intelligent.

It is endemic to the Andaman Islands. You can find it in almost every habitat, from the deep primary forest to the mangroves and even the village gardens. It is an insectivore. A master of the "sally". It perches on an exposed branch, watching the air. When a moth, a dragonfly, or a bee passes by, the drongo launches. It performs loops and rolls in mid-air. It snaps the insect with its bill. The snap of the beak is audible. It then returns to the same perch to consume the meal.

The Andaman Drongo is a vocal mimic. Its own call is a mix of harsh, metallic notes and sweet whistles. But it doesn't stop there. It imitates the calls of other birds. The Shikra. The Serpent-Eagle. The Andaman Treepie. It uses these mimics to confuse other birds or to scare them away from food sources. It is also a fierce protector of its nest. It will dive-bomb much

larger birds, including crows and raptors, if they come too close. Because of this, smaller, more vulnerable birds often nest near drongos for protection.

The nest is a neat, thin-walled cup made of fine twigs and fibers. It is often suspended in the horizontal fork of a high branch, looking like a hammock. It is reinforced with spider webs. This gives it strength and flexibility during the high winds of the monsoon. The Andaman Drongo is currently stable in population. Its adaptability has served it well. It is a ubiquitous presence. A black shadow that guards the island's airways.

Andaman Treepie (Dendrocitta bayleyi)

The Andaman Treepie is the most elegant member of the crow family in the archipelago. It is smaller than the mainland treepies. Its plumage is a sophisticated palette of greys and tawny browns. The head and neck are a dark, charcoal grey. The mantle and underparts are a warm, cinnamon brown. The wings are black with a prominent white patch. The tail is long and graduated. It is a pale grey with black tips. The bill and legs are black. The eyes are a striking, deep blue-grey.

This bird is restricted to the Andaman Islands. It is a bird of the canopy. It prefers the humid evergreen forests of the hills. It is social. You will rarely find it alone. It moves in small, noisy groups of four to six birds. They move through the high branches, looking for fruits, seeds, and small animals. They are omnivorous. They will eat wild figs, but they also hunt for lizards, frogs, and the eggs of smaller birds. They are the forest's opportunists.

The Andaman Treepie is known for its wide repertoire of sounds. It is an talkative bird. Its calls range from harsh, metallic cackles to surprisingly melodious whistles. It has a characteristic "musical" call that sounds like a bell. It is also an accomplished mimic. Like the drongo, it incorporates the sounds of its neighbors into its own songs. When a flock of treepies moves through the forest, it creates a wall of sound. They are the gossips of the canopy.

Nesting occurs in the pre-monsoon months. The nest is a shallow platform of thorny twigs. It is lined with finer roots and fibers. It is usually hidden deep within a thicket of climbing bamboo or a dense crown of a forest tree. The eggs are a pale greenish-blue with brown markings. The Andaman Treepie is currently listed as Least Concern. However, its reliance on the high canopy makes it vulnerable to large-scale clearing of the hills. It is a bird of the interior. A creature of the high, green cathedrals.

Andaman Bulbul (Brachypodius fuscoflavescens)

The Andaman Bulbul is a burst of olive and gold in the understory. For a long time, it was considered a subspecies of the Black-headed Bulbul, but it is now recognized as a full species endemic to the Andamans. It lacks the black head of its cousins. Instead, its head is a dull olive-green. The rest of the body is a vibrant, yellowish-green. The throat is a brighter yellow.

The most distinctive feature is the eye. The iris is a startling, pale blue or white. It gives the bird a wide-eyed, perpetually surprised expression.

It is common throughout the islands. It inhabits forest edges, secondary growth, and scrub. It is particularly fond of fruiting shrubs and small trees. It is an active, restless bird. It rarely stays still for long. It flits through the foliage, picking off small berries and occasional insects. It is often seen in pairs or small groups. They are not particularly shy. They will often approach human settlements if there are fruiting trees nearby.

The call of the Andaman Bulbul is a cheerful, bubbly whistle. It is less complex than the songs of the treepies or drongos, but it is constant. It is a "happy" sound. A series of short, staccato notes that rise and fall. It is one of the most common sounds in the disturbed forests and plantations of the islands. The nest is a typical bulbul construction. A small, neat cup made of dry leaves, grass, and cobwebs. It is usually placed in a low bush or a small tree, often less than two meters from the ground.

The Andaman Bulbul is a success story of island adaptation. It has thrived even as the primary forests have been altered. It is a pioneer species. It moves into new areas as they are cleared and then start to regrow. It is an important seed disperser for secondary forest plants. It is a small bird with a big impact. A golden thread in the island's ecological fabric.

Andaman Cuckooshrike (Coracina dobsoni)

The Andaman Cuckooshrike is a study in monochromatic subtlety. It is endemic to the Andaman Islands. The male is a uniform, dark slate-grey. The feathers are smooth. Tight. The underparts are slightly paler. The most distinguishing feature of the male is the black mask extending from the base of the bill, through the eyes, to the ear coverts. The female is different. She is paler grey and has fine, dark barring on her underparts. Her eyes are a deep, liquid brown. The bill is heavy, black, and hooked.

This bird is a forest specialist. It prefers the canopy of both evergreen and deciduous forests. It is a quiet bird. It moves slowly. It has a habit of perching upright on a high branch and scanning the surrounding foliage for large insects. It is particularly fond of caterpillars. It will also take small fruits and berries. Its movements are deliberate. It does not flit. It glides from tree to tree with a rhythmic, undulating flight pattern.

The call is a loud, ringing whistle. *Pee-ee-oo*. It is clear and carries well through the trees. It is often heard in the heat of the afternoon when other birds are silent. The Andaman Cuckooshrike is solitary or found in pairs. It does not join the noisy mixed-species flocks that characterize the island's forests. It is an independent operator. The nesting habits are cryptic. The nest is a very small, shallow cup made of twigs and decorated with lichens. It is placed high in a tree fork, often camouflaged to look like a knot on the branch.

The population of the Andaman Cuckooshrike is currently stable. However, like all forest specialists, it relies on the presence of large, undisturbed tracts of timber. It is a bird of the quiet interiors. A grey shadow that maintains the balance of the insect world in the high canopy.

Andaman Shama (Copsychus albiventris)

The Andaman Shama is the undisputed songster of the island undergrowth. It is a close relative of the White-rumped Shama found on the mainland, but it is a distinct endemic. It is a stunning bird. The head, back, and breast are a glossy, midnight blue. The belly is a stark, clean white. The wings are black. The tail is long and graduated, with white outer feathers that flash during flight. The female is a duller, greyish-brown version of the male but still possesses the elegant shape and white belly.

This bird is a denizen of the dense forest understory. It loves the tangled thickets of bamboo, cane, and small palms. It is a ground-feeder. It hops through the leaf litter, tossing leaves aside with its bill to find insects, spiders, and worms. It is a shy bird. It prefers the deep shade. You will often see its long tail disappearing into a bush before you get a clear look at its face. It is most active in the early morning and late evening.

The song of the Andaman Shama is a masterpiece. It is a complex, liquid melody of whistles, trills, and fluty notes. It is incredibly loud for a bird of its size. The song is varied and includes mimicry of other forest sounds. Each male has his own unique song. They use these melodies to define large territories in the forest. In the pre-dawn darkness of the Andaman woods, the Shama's song is the first to break the silence. It is a pure, clear sound that seems to vibrate through the humid air.

Nesting occurs in the hollows of trees or in the stumps of broken bamboo. The nest is a simple collection of dry leaves and grass. The Andaman Shama is currently common, but it is a favorite target of the illegal bird trade. Its beautiful song makes it a prized caged bird. Protection of its habitat and strict enforcement of wildlife laws are essential to keep this voice alive in the wild. It is the soul of the Andaman understory.

Andaman Flowerpecker (Dicaeum virescens)

The Andaman Flowerpecker is a tiny, energetic jewel. It is one of the smallest birds in the archipelago. It is endemic to the Andamans. Its plumage is an understated olive-green on the back and a pale, yellowish-white on the underparts. It lacks the bright colors of some of its mainland relatives. But what it lacks in color, it makes up for in activity. Its bill is short, curved, and sharp. Perfect for probing the centers of tiny forest flowers.

This bird is a specialist of the high canopy and the forest edge. It is almost always in motion. It flits from flower to flower with a rapid, direct flight. It is a nectar feeder, but it also plays a crucial role in the lifecycle of the mistletoe plants that grow on the island's trees. The flowerpecker eats

the mistletoe berries. The seeds are sticky. When the bird defecates, the seeds stick to the branches of trees, where they germinate. This relationship is a classic example of co-evolution.

The call of the Andaman Flowerpecker is a sharp, metallic *chip-chip-chip*. It is constant. You can track the bird's movement through the canopy just by following the sound. It is a social bird, often found in the company of sunbirds and bulbuls at flowering trees. The nest is an architectural marvel. It is a tiny, pear-shaped purse suspended from the tip of a twig. It is made of fine plant fibers, spider webs, and down. It is incredibly strong and flexible, swaying in the wind like a piece of fruit.

The Andaman Flowerpecker is common throughout the islands. Its adaptability to different forest types and even gardens has ensured its survival. It is a tiny engine of the forest, moving nutrients and seeds across the canopy. It is a reminder that in the world of the Andamans, even the smallest creatures have a vital role to play.

Andaman Coucal (Centropus andamanensis)

The Andaman Coucal is a heavy, terrestrial cuckoo that has forgotten how to be a parasite. Unlike many other cuckoos, it builds its own nest and raises its own young. It is a large bird. Endemic to the Andamans. Its plumage is a striking contrast. The head, mantle, and underparts are a pale, creamy buff or tan. The wings and tail are a deep, chestnut brown. The eyes are a brilliant, piercing red. The bill is heavy, black, and hooked. It is a bird built for the ground.

It is common in a variety of habitats. Mangroves. Scrub. Secondary forest. It is even found in the tall grass near the paddy fields. It is a clumsy flier. It prefers to walk or hop through the dense undergrowth. It is a predator. It hunts for large insects, frogs, lizards, and even the eggs and chicks of other birds. It is often seen stalking through the leaf litter or climbing through the low branches of a hibiscus bush. It moves with a deliberate, predatory intent.

The call of the Andaman Coucal is a deep, resonant *whoot-whoot-whoot*. It is a low-frequency sound that carries for long distances through the humid air. It is often heard in the early morning or before a rainstorm. The locals call it the "crow pheasant". The nest is a large, messy globe of twigs and leaves, hidden deep within a thorny thicket or a dense clump of grass. It has a side entrance. The parents are diligent, bringing a constant supply of lizards and grasshoppers to the growing chicks.

The Andaman Coucal is a resilient species. It has adapted well to the human-modified landscapes of the islands. It is a bold, visible part of the island's fauna. It is a creature of the edges. A tan and chestnut ghost that patrols the island's gardens and groves.

Andaman Woodpigeon (Columba palumboides)

The Andaman Woodpigeon is a shy giant of the high canopy. It is a large pigeon. Endemic to the Andaman and Nicobar Islands. Its plumage is a dark, slatey grey. It looks almost black in the

shadows. The head is a paler, silver-grey. The most beautiful feature is the iridescent patch on the back of the neck. It shimmers with green and purple highlights. The bill is a pale yellow with a reddish base. The eyes are a deep, dark orange. It is an imposing bird.

It is a specialist of the primary evergreen forests. It is rarely found in disturbed areas. It lives in the high canopy, where it feeds on the fruits of wild nutmeg, figs, and palms. It is a silent bird. It does not coo like a domestic pigeon. It moves through the trees with surprising stealth for its size. When it does fly, the sound of its wings is a heavy, rhythmic clap. It is often seen in pairs or small groups of three to four birds.

The nesting habits of the Andaman Woodpigeon are poorly understood. It is believed to nest high in the forks of the tallest forest trees. A simple platform of sticks. The species is listed as Near Threatened. Its reliance on large, fruiting trees in the primary forest makes it vulnerable to logging and habitat loss. It is also a target for hunters. The woodpigeon is a symbol of the old, undisturbed forests of the archipelago. It is a bird of the deep silence.

Andaman Cuckoo-dove (Macropygia rufipennis)

The Andaman Cuckoo-dove is an elegant, long-tailed inhabitant of the forest edge. It is endemic to the Andaman and Nicobar Islands. Its plumage is a rich, saturated rufous-brown. It looks like the color of burnt earth. The head is a slightly paler ginger. The tail is exceptionally long and graduated. When the bird flies, the tail fans out, showing a beautiful pattern of brown and black. The eyes are a bright, clear red. The bill is small and dark.

This bird prefers secondary forest, forest edges, and the tangled growth of abandoned clearings. it is often found near fruiting shrubs and small trees. It is more active than the woodpigeon. It flits between bushes with a light, buoyant flight. It is often seen on the ground, picking up fallen seeds and grit. It is a social bird, sometimes gathering in small groups at a particularly rich food source.

The call of the Andaman Cuckoo-dove is a soft, two-note coo. *Ku-wuck*. The second note is higher and emphasized. It is a gentle sound. It blends into the background of the forest. The nest is a fragile platform of twigs, usually placed in a low tree or a dense shrub. The Andaman Cuckoo-dove is currently listed as Near Threatened. Like the woodpigeon, it faces pressure from habitat loss and hunting. It is a bird of the regenerating forest. A rufous streak across the island's clearings.

Andaman Green Pigeon (Treron chloropterus)

The Andaman Green Pigeon is a master of camouflage in the fruiting canopy. It is endemic to the Andaman and Nicobar Islands. Its plumage is a vibrant, yellowish-green. This color matches the leaves of the Ficus trees perfectly. The wings are marked with black and yellow bars. The male has a beautiful, lilac-colored patch on the shoulder. The female is entirely green. The bill is a soft blue-grey with a greenish tip. The legs are a bright, startling red.

These pigeons are gregarious. They are almost always found in flocks, sometimes numbering up to twenty or thirty birds. They are specialists of the fruiting trees. When a Banyan or a Peepal tree is in fruit, the Green Pigeons descend. They are acrobatic feeders. They will hang upside down to reach a ripe fig. They are surprisingly difficult to see when they are still. They disappear into the green foliage. Only their bright red legs give them away.

The call of the Andaman Green Pigeon is not a coo. It is a series of strange, liquid whistles and croaks. It sounds more like a primate than a bird. The flocks are noisy and active. They move together between fruiting trees with a fast, whistling flight. The nest is a typical pigeon platform of sticks, hidden in the dense foliage of a forest tree. The Andaman Green Pigeon is currently stable. It is a vital seed disperser for the island's many species of wild figs. It is a green spirit of the high canopy.

White-headed Starling (Sturnia erythropygia)

The White-headed Starling is a striking endemic of the Andaman and Nicobar Islands. It is a bird of the open forest and human-modified landscapes. Its plumage is a clean, sharp contrast. The head, neck, and breast are a pure, snowy white. The back and wings are a dark, slatey grey. The rump and the base of the tail are a vibrant, rusty orange. The eyes are a pale, piercing white. The bill is a bright, butter-yellow. It is one of the most visible birds in the islands.

It is a social bird. You will see them in large flocks, often perched on the wires in Port Blair or foraging in the cattle pastures. They are omnivorous. They eat fruits, seeds, and insects. They are particularly fond of the nectar of the Silk Cotton tree. When the trees bloom in the dry season, the White-headed Starlings gather in the hundreds. They are bold and noisy. Their calls are a mix of harsh chattering and clear whistles.

Nesting occurs in the hollows of trees. They often use old woodpecker holes or the cavities in rotting coconut palms. They are aggressive in defending their nest sites. The White-headed Starling is common and widespread. It has benefited from the opening up of the forest. It is a bird of the sun. A white-crowned herald of the island's open spaces.

Andaman Teal (Anas albogularis)

The Andaman Teal is a rare and specialized duck found only in this archipelago. It is a small, dark duck. Its plumage is a mottled chocolate brown. The most distinctive feature is the white ring around the eye. In some individuals, the white extends across the throat and forehead. This white patch varies between birds, making each one unique. The bill is a dark, slatey blue. The legs are a dull grey.

This teal is a specialist of the brackish water systems. It inhabits the mangrove creeks, the coastal marshes, and the tidal inlets. It is often seen in small groups, dabbling in the mud at low tide. It feeds on seeds, aquatic plants, and small invertebrates. It is a secretive bird. During the

heat of the day, it hides deep within the mangrove roots. It is most active at night. It is a strong flier, moving between different feeding grounds under the cover of darkness.

The Andaman Teal is Endangered. Its population is small and fragmented. It is highly sensitive to the disturbance of the mangrove ecosystems. Pollution, the clearing of mangroves for shrimp farming, and illegal hunting are major threats. The bird is a symbol of the island's coastal health. It represents the intersection of the forest and the sea. Protecting the quiet, muddy reaches of the Andaman creeks is the only way to ensure the survival of this unique duck. It is a brown shadow in the white of the mangroves.

Identifying this endemic duck in the dappled shadows of the *Rhizophora* roots requires a keen eye for its "spectacles" - a stark, white ring of feathers encircling the eye that provides a ghostly contrast against its soot-brown plumage. Unlike the gregarious migratory ducks that arrive during the winter, the Andaman Teal is a stoic, year-round resident of the archipelago. It avoids the open sunlight of the bays, preferring the claustrophobic protection of the stilt roots.

The bird’s survival is tethered to the health of specific sites like the Sippighat wetlands and the remote muddy reaches of North Andaman. When night falls, its sharp, whistling call - a series of low, staccato notes - replaces the daytime silence of the salt pans. This isn't just a bird; it is a specialist of the "between-places," thriving where the tide blurs the line between land and sea. To lose the teal would be to lose the primary sentinel of the Andaman’s blue carbon sinks. Its presence is the litmus test for whether our wilder coasts remain truly wild.

MARINE ECOSYSTEMS: The Carbonate Architecture of the Deep

The underwater landscape of the Andaman and Nicobar Islands is defined by the massive, relentless accumulation of calcium carbonate. This is not a static environment: it is a biological factory. The reefs are constructed by millions of tiny polyps that extract minerals from the seawater to build hard, stony skeletons. These structures form the foundation for all marine life in the archipelago, creating a labyrinth of shelters and hunting grounds that extend from the tidal fringe to the drop-offs of the continental shelf.

Staghorn Corals (Acropora spp.)

Staghorn corals are the primary architects of the shallow reef. They appear as calcified thickets, with long, slender branches that mimic the antlers of a deer. In the clear waters of Jolly Buoy and North Bay, these colonies form dense, brittle forests. Their growth rate is among the fastest of all coral species, often extending ten to fifteen centimeters per year, yet they are extremely vulnerable. The skeleton is porous and fragile: a single poorly placed anchor or the kick of a diver’s fin can shatter fifty years of growth into a pile of white, dead rubble.

The tips of the staghorn are often tinted with electric blue, lavender, or sharp yellow. This coloration marks the site of the most active polyps. When you hover over a healthy thicket, you can hear the raw, mechanical sound of the reef: the rhythmic scraping of parrotfish teeth

grinding against the carbonate. They consume the algae within the coral, eventually excreting the fine white sand that defines the island's beaches. It is a violent, necessary cycle of construction and erosion.

Brain Corals (Platygyra and Leptoria spp.)

In contrast to the fragile *Acropora*, Brain corals are the heavy, slow-growing anchors of the ecosystem. They form massive, rounded boulders that can reach several meters in diameter. The surface is a complex system of deep, winding grooves, resembling the convoluted folds of a human brain. These grooves are the rows of interconnected polyps that work in unison to expand the colony by only a few millimeters each year.

Brain corals are survivors. Their density allows them to withstand the surge of monsoonal storms that would level a staghorn forest. At sites like the Natural Rock Bridge on Neil Island, the exposed skeletons of ancient brain corals are visible during the lowest spring tides. They are hard, cold, and ancient: a colony the size of a small car may be over four hundred years old. They have witnessed the tectonic shifts of 2004 and the rising temperatures of the modern era. To touch one is to touch a living chronicle of the Bay of Bengal's long-term environmental history.

Table Corals (Acropora hyacinthus)

Table corals grow as wide, horizontal plates, designed to maximize their surface area for photosynthesis. A single colony can span two meters in diameter, supported by a thick central stalk. These corals act as the umbrellas of the reef floor. They create large zones of shadow, providing critical refuge for groupers, snappers, and sweetlips during the intense midday sun.

However, this horizontal architecture makes them the first victims of environmental stress. During the massive sea surface temperature spikes of 2010 and 2016, the table corals were the first to bleach. When the water temperature remains two degrees above the seasonal average for several weeks, the coral expels its symbiotic algae, turning a ghostly, translucent white. On the eastern fringes of Havelock, large sections of the reef are now occupied by the grey, skeletal remains of these tables, now overgrown with suffocating turf algae. This is a visual indicator of the silent crisis: the carbonate foundation is being replaced by organic debris.

Fan Corals
(Gorgonia)

Gorgonians are the lace-makers of the deep reef slopes. Unlike the rigid, calcium-heavy structures of the brain or staghorn varieties, fan corals are composed of a flexible, wood-like protein called gorgonin. They are most prominent in the high-velocity channels between Havelock and Peel Island, where the tidal currents carry a constant supply of microscopic plankton. These corals do not grow haphazardly. They orient their broad, flat faces precisely perpendicular to the prevailing current, acting as biological nets. Each branch is covered in

thousands of tiny, translucent polyps that extend their stinging tentacles into the flow to seize passing nutrients.

The color of a healthy fan coral is a raw, vibrant rust, deep crimson, or occasional burnt orange. This pigment is not for aesthetics; it is a chemical defense against the encroaching sponge populations that seek to overgrow the colony. If you look closely at the base of a fan coral in the deeper reaches of the South Button Island reef, you will often find pygmy seahorses that have evolved to perfectly mimic the texture and color of the coral's nodules. It is an architecture of survival that requires a delicate balance of water pressure and temperature. When the currents slow or the water becomes turbid with silt from coastal construction, the fan coral's polyps choke. The crimson fades to a brittle, skeletal grey, and the fan collapses under its own weight, a victim of the changing chemistry of the Andaman Sea.

Blue Corals (Heliopora coerulea)

The Blue coral is a biological anomaly. While most stony corals belong to the order Scleractinia, the Blue coral is an octocoral, the only one of its kind to produce a massive, permanent skeleton. To the casual snorkeler at Elephant Beach, the living colony looks like a cluster of grey or olive-brown cauliflower. The true identity of the species is hidden beneath this drab exterior. The skeleton itself is a brilliant, permanent indigo, stained by the concentration of iron salts within its calcite structure.

This species is a relic of an older ocean, a survivor from the Cretaceous period. It thrives in the surge zones where other corals might be crushed by the weight of the surf. Because its blue pigment does not fade after the animal dies, the skeletons of Blue corals are often washed up on the shores of Little Andaman, appearing as cobalt-colored stones among the white fragments of the reef. These colonies provide a specific, dense habitat for small crustaceans and juvenile reef fish that require a substrate that can withstand the violence of the intertidal zone.

Mushroom Corals (Fungia spp.)

Unlike the massive colonies of the reef wall, Mushroom corals are solitary. They consist of a single, giant polyp that can reach twenty centimeters in diameter. These corals are not attached to the sea floor. They lie loose on the sandy patches between reef outcrops, looking like discarded, calcified fungal caps. The surface of a Mushroom coral is a series of sharp, radiating ridges that lead toward a central slit, which serves as both mouth and waste vent.

Mushroom corals possess a limited but vital form of mobility. If a storm surge buries them in sand or flips them over, the polyp can inflate its body with seawater, pulsing its tissue to push against the substrate. This hydraulic action allows the coral to right itself or even crawl slowly across the seabed to find better light. It is a slow, mechanical process, invisible to the naked eye but essential for a creature that lives on the shifting sands of the reef's edge.

Boulder Corals (Porites spp.)

Boulder corals are the heavyweights of the Andaman reef systems. They grow in enormous, solid lumps, often resembling submerged boulders or rounded hillocks. In the shallow waters of North Bay or the Mahatma Gandhi Marine National Park, some of these colonies have reached heights of three meters. They grow at a glacial pace, often adding less than one centimeter of vertical height per year. This slow metabolic rate makes them incredibly stable. They are the bedrock of the reef, providing a solid surface for more delicate species to anchor upon.

When you look at the surface of a Porites colony, you see a texture like fine-grained sandpaper. Each grain is a tiny, circular pore containing a polyp. During the day, these polyps are retracted, giving the coral a smooth, stone-like appearance. At night, they extend in a fuzzy, microscopic field to feed. These corals are also the engineers of micro-atolls. In very shallow water, the top of the coral dies when it hits the air during low tide, but the sides continue to grow outward, creating a flat-topped, ring-shaped structure. These micro-atolls are vital for scientists because they act as natural tide gauges, recording the sea level history of the islands over centuries.

The Sculptors of the Andaman Reefs

If the corals provide the rigid architecture of the islands, the fish are the active agents of its change. More than 1,200 species have been recorded across the Andaman and Nicobar archipelago, creating a high-functioning ecosystem where every bite taken from the reef contributes to the physical geography of the islands. Among these, the grazers are the most industrious.

Parrotfish (Scaridae)

The sound of a parrotfish feeding is a distinct, rhythmic scraping that carries through the water at places like Jolly Buoy. They possess fused teeth that form a parrot-like beak, designed to bite off chunks of calcium carbonate. They do not eat the coral itself but the endolithic algae living within the skeleton. A single large Green Humphead Parrotfish (Bolbometopon muricatum), which can grow to over a meter in length, can process five tons of coral into sand every year.

This is the raw mechanics of the island-building process. The white sand of Radhanagar and Elephant Beach is largely the byproduct of parrotfish digestion. They graze the reef clean, preventing algae from smothering the coral polyps. However, they are highly sensitive to nighttime disturbances. Parrotfish secrete a transparent mucus cocoon around themselves at night to mask their scent from predators like moray eels. In areas with high boat traffic or night diving, these fish often fail to settle, leading to a decline in reef health as the algae go unchecked.

Surgeonfish (Acanthuridae)

Named for the razor-sharp, spine-like scalpels located on either side of the caudal peduncle (the base of the tail), surgeonfish are the primary herbivores of the Andaman reefs. The Powder Blue Surgeonfish (Acanthurus leucosternon) is a common sight in the surge zones of Neil

Island. Their bodies are laterally compressed, allowing them to slip into narrow crevices to escape currents or predators.

Their role is functional and urgent. They act as the lawnmowers of the reef. Without them, the turf algae would grow at an exponential rate, covering the available substrate and preventing new coral larvae from settling. In the context of the Great Nicobar Project, the threat to surgeonfish is indirect but fatal. As dredging for the transshipment port begins, the resulting silt clouds will coat the algae. Surgeonfish cannot consume silt-laden food. Their digestive tracts become clogged with inorganic sediment, leading to mass mortality events. When the surgeonfish die, the reef enters a phase shift where coral dominance is lost to a thick, suffocating carpet of brown algae.

Clownfish (Amphiprioninae)

The relationship between the clownfish and the sea anemone is the most documented symbiosis in the Andaman Sea. At the Lighthouse dive site near Havelock, the Clark's Anemonefish (Amphiprion clarkii) is frequently found within the stinging tentacles of the Magnificent Sea Anemone. The fish is protected by a layer of specialized mucus that prevents the anemone's nematocysts from firing.

The clownfish provides the anemone with nutrients via its waste and aggressively defends it against polyp-eating butterflyfish. However, this survival strategy makes the species entirely sedentary. A clownfish rarely ventures more than a meter away from its host anemone. If the anemone bleaches or dies due to rising water temperatures, the clownfish is left without a defense mechanism and is quickly consumed by larger predators like groupers. In the shallow reef flats of the Nicobars, the disappearance of these bright orange and black residents is a direct symptom of the thermal stress affecting the entire symbiotic chain.

Butterflyfish (Chaetodontidae)

Butterflyfish are the visual indicators of a reef's vital signs. Their presence or absence tells a story of coral health that no satellite can capture. With bodies as thin as a coin and patterns that mimic eyes on their tails to confuse predators, they navigate the labyrinth of the reef with high precision. Many species, such as the Andaman Butterflyfish (Chaetodon andamanensis), are obligate corallivores. They do not merely live among the corals; they eat them. They use their elongated, tweezer-like snouts to pluck individual polyps from their calcium carbonate homes.

Because they are so specialized, they are the first to disappear when a reef enters a state of decay. If the water temperature rises by even two degrees Celsius for a prolonged period, the coral expels its zooxanthellae and turns a ghostly white. The butterflyfish, finding their only food source dead and covered in slime, begin to starve. In the waters around the Nicobar Islands, particularly near the sites slated for the transshipment port, the population density of these fish has served as a baseline for ecological monitoring. The loss of these fish signifies a collapse of

the middle tier of the food web. They are the specialists of the Andaman Sea, and in an environment shifting toward industrialization, specialists are the first to perish.

Damselfish (Pomacentridae)

Damselfish are the tiny, fierce farmers of the reef. The Sergeant Major (Abudefduf saxatilis) is perhaps the most visible fish in the Andamans, often congregating around jetties and shallow snorkeling spots. Despite their small size, they are intensely territorial. Many damselfish "farm" their own patches of algae, aggressively weeding out unwanted species and driving away much larger fish that attempt to graze on their crop. They have been known to nip at the masks and fingers of snorkelers who stray too close to their nests.

This aggression is a survival mechanism. They are the backbone of the reef's food web, providing a constant source of prey for larger predators while also managing the microscopic landscape of the coral surface. Their populations are highly sensitive to noise pollution. In areas with high motorboat traffic, such as the ferry routes between Havelock and Port Blair, damselfish exhibit signs of chronic stress, including reduced reproductive success and impaired larval development. The constant thrum of engines interferes with the acoustic signals they use to defend their territory and attract mates.

Angelfish (Pomacanthidae)

Angelfish are the royalty of the Andaman depths, known for their vibrant, iridescent patterns and regal movements. The Emperor Angelfish (Pomacanthus imperator) undergoes a dramatic transformation as it matures. Juveniles are dark blue with white and light blue concentric rings, a pattern designed to confuse predators in the shadows of the reef. As they transition to adulthood, they develop horizontal yellow and blue stripes and a black mask over the eyes. This change is so profound that early biologists believed the juveniles and adults were different species.

Unlike butterflyfish, angelfish have a more varied diet, often feeding on sponges and tunicates that contain toxic compounds. This diet makes their flesh unpalatable to many predators. They are frequently found in the deeper, cooler waters of the Cinque Islands and the walls of Barren Island. Their primary threat is the ornamental fish trade. Because of their striking beauty, they are harvested using cyanide, a practice that stuns the fish but kills the surrounding coral and often leads to the delayed death of the fish itself in captivity.

Groupers (Serranidae)

While the butterflyfish represent the delicacy of the reef, the groupers represent its raw, predatory power. The Giant Grouper (Epinephelus lanceolatus) is the apex resident of the deeper reef slopes and caves. These fish can grow to nearly three meters in length and weigh over 400 kilograms. They are ambush predators, often staying perfectly still for hours in the dark

recesses of a wreck or a large coral overhang, blending in with the mottled shadows using their camouflaged skin.

The grouper’s hunting method is a violent displacement of water. When prey comes within range, the grouper opens its massive mouth, creating a vacuum that sucks the victim in whole. In the fish markets of Port Blair, you can see the smaller cousins of these giants, the Malabar Groupers, laid out on ice. They are highly prized for their firm flesh, which has led to significant overfishing in the unprotected zones of the archipelago. The larger individuals are becoming rarer. The removal of these top predators has a "top-down" effect on the reef. Without groupers to control the population of smaller carnivorous fish, the balance of the ecosystem shifts, often leading to an overabundance of species that prey on the essential grazers like the parrotfish.

Snappers (Lutjanidae)

Snappers are the schooling backbone of the Andaman marine environment. In the twilight hours at sites like Minerva Ledge, schools of Blue-striped Snappers (Lutjanus kasmira) form dense, yellow clouds that pulse with the rhythm of the current. They are generalists, feeding on a mix of small fish and crustaceans. Their importance lies in their biomass. They are a primary food source for larger predators and a staple for the local artisanal fishing communities.

The threat to snappers in the Great Nicobar Project is sensory. Like many marine fish, snappers rely on acoustic cues for navigation and social cohesion. The construction of the planned 72,000 crore development involves massive dredging and the constant thrum of heavy machinery. This creates an underwater acoustic fog. For a snapper, this noise is not just an annoyance; it is a blinding force. It masks the sounds of approaching predators and disrupts the signals used to locate spawning grounds. When the school cannot hear itself, it cannot survive.

Triggerfish (Balistidae)

Triggerfish are the architects of aggression on the reef flats. The Titan Triggerfish (Balistoides viridescens) is notorious among divers at Elephant Beach for its fierce territoriality. These fish use their powerful jaws and specialized teeth to crunch through the shells of sea urchins and crabs. They are the only animals capable of flipping over a long-spined sea urchin to reach its soft underside without being impaled.

Their name comes from a unique dorsal fin. The first spine is locked into place by a second, smaller spine, the "trigger." This allows the fish to wedge itself into a narrow crevice at night, making it impossible for a predator to pull it out. During nesting season, the Titan Triggerfish will attack anything that enters the cone-shaped airspace above its nest. They have been known to bite chunks out of rubber fins and, occasionally, the legs of unsuspecting swimmers. They represent the rugged, unyielding side of the Andaman’s natural defense.

Moray Eels (Muraenidae)

Moray eels are the serpentine sentinels of the Andaman reef crevices. The Giant Moray (Gymnothorax javanicus) is a frequent inhabitant of the volcanic rock formations at Barren Island and the submerged ledges of Havelock. Unlike most fish, morays lack scales. Their skin is protected by a thick, toxic mucus that allows them to slide into razor-sharp coral gaps without sustaining abrasions. This mucus also serves a secondary purpose, it acts as a bacterial barrier and a deterrent to skin-dwelling parasites.

The anatomy of the moray is a study in specialized predation. They possess a secondary set of jaws known as pharyngeal jaws. While the primary jaws hold the prey, the pharyngeal jaws launch forward from the throat to pull the victim deeper into the esophagus. They are almost entirely reliant on their sense of smell, as their eyesight is poor. In the turbid waters near Port Blair's construction zones, where siltation reduces visibility to less than a meter, the moray remains an effective hunter. However, the destruction of the reef structure for jetty expansion removes their primary habitat. A moray without a hole is a moray without a future. They become vulnerable to the larger groupers and sharks they usually evade by retreating into the labyrinth of the reef.

Wrasse (Labridae)

The wrasse family provides the necessary labor force for the reef's health. The Napoleon Wrasse (Cheilinus undulatus), also known as the Humphead Wrasse, is the titan of this group. Found in the deeper waters of the Mahatma Gandhi Marine National Park at Wandoor, these fish can live for over thirty years and reach lengths of six feet. They are easily identified by their thick, fleshy lips and the prominent hump on their foreheads that grows more pronounced with age.

Napoleon Wrasse are among the few predators capable of consuming toxic species like the Crown-of-Thorns starfish and boxfish. This makes them a keystone species. Without them, the Crown-of-Thorns populations can explode, leading to the rapid consumption of entire coral colonies. They are protogynous hermaphrodites, meaning many begin life as females and transition to males as they grow. This biological complexity makes them exceptionally vulnerable to overfishing. In the illegal international trade, a single Napoleon Wrasse can fetch thousands of dollars as a status symbol on dinner tables in East Asia. Despite being listed under CITES Appendix II, the lack of patrolling in the remote Nicobar waters allows for a slow, silent extraction of these blue-green giants.

Bannerfish (Heniochus)

Bannerfish are the silhouettes of elegance against the blue voids of the Andaman Sea. The Schooling Bannerfish (Heniochus diphreutes) are often found in massive aggregations at South Button Island. They are distinguished by their long, white dorsal filaments that trail behind them like streamers in the current. Unlike the similar-looking Moorish Idol, bannerfish are hardier and feed primarily on zooplankton.

Their presence indicates a high-flow environment rich in nutrients. They often congregate near cleaning stations, waiting for smaller cleaner wrasse to remove necrotic tissue and parasites from their bodies. In the context of the Great Nicobar Project, these fish face a direct threat from the alteration of current patterns. The construction of massive breakwaters and transshipment terminals changes how water moves around the islands. When the current slows or becomes blocked, the zooplankton concentrations shift, and the cleaning stations are abandoned. The bannerfish, dependent on these specific hydrodynamic conditions, are forced to migrate or face a decline in fitness due to increased parasite loads.

Sea Turtles (Cheloniidae and Dermochelyidae)

The Andaman and Nicobar Islands are perhaps the most significant nesting grounds for sea turtles in the entire Indian Ocean. Four primary species utilize these shores: the Green Sea Turtle (Chelonia mydas), the Hawksbill (Eretmochelys imbricata), the Olive Ridley (Lepidochelys olivacea), and the massive Leatherback (Dermochelys coriacea).

The Leatherback Sea Turtle

The Leatherback is the undisputed king of the marine reptiles. It is a biological anomaly. Unlike other sea turtles, it lacks a hard, bony shell. Instead, its carapace is composed of a thick, leathery skin embedded with thousands of tiny bone plates. This allows the Leatherback to dive to depths of over 1,200 meters, as the flexible shell can compress under the immense pressure of the deep ocean without cracking.

Galathea Bay, located on the southern tip of Great Nicobar Island, is the most critical nesting site for this species in the region. The Leatherbacks travel thousands of miles across the Pacific and Indian Oceans to return to the exact beach where they were hatched. They are "thermal regulators," capable of maintaining a body temperature higher than the surrounding water, which allows them to venture into sub-arctic regions where other reptiles would perish.

The Hawksbill Turtle

While the Leatherback occupies the deep sea, the Hawksbill is the resident of the coral reefs. They are named for their narrow, pointed beaks which allow them to reach into crevices to extract sea sponges. Their shells are highly patterned and were once the primary source for "tortoiseshell" jewelry, a trade that decimated their numbers before international bans were enacted.

In the Andamans, Hawksbills are frequently seen at North Reef Island and Cinque Island. They are essential for reef health because they prevent sponges from overgrowing the corals. If the sponges are not kept in check, they outcompete the coral polyps for space, leading to a loss of structural diversity. The destruction of reefs at Great Nicobar to make way for the "Holistic Development" project removes the Hawksbill’s kitchen and its home.

The Green Sea Turtle

The Green Sea Turtle is the only true herbivore of the group, a dedicated grazer that spends its life manicuring the Andaman's underwater pastures. Its name is a reference to its internal biology rather than its shell; a steady diet of seagrass tints its body fat a vivid emerald, a direct result of the sheer volume of chlorophyll it consumes.

They act as the archipelago's maritime groundskeepers. By relentlessly cropping the seagrass meadows, they prevent the blades from growing long, woody, and choked with epiphytes. This constant pruning stimulates fresh, nutrient-rich growth and ensures sunlight reaches the seabed, maintaining the oxygenated nurseries required for the juvenile snappers and tiger prawns that sustain the Andaman's artisanal fisheries.

The Olive Ridley Turtle

The Olive Ridley is the smallest and most numerous of the sea turtles, recognizable by its heart-shaped, olive-drab carapace. While its cousins on the Odisha coast are famous for the *arribada* - the mass synchronized nesting of thousands - the Ridleys of the Nicobars are more solitary, preferring the quiet, undisturbed stretches of sand near the mouths of creeks.

They serve as the tactical generalists of the mangrove fringes and reef flats. Using powerful, hooked beaks, they forage through the sediment for crabs and shrimp or snatch drifting jellyfish from the water column, acting as a biological check that prevents invertebrate populations from overwhelming these murky, nutrient-rich nurseries.

The Loggerhead Turtle

The Loggerhead Turtle (*Caretta caretta*) is the archipelago's most infrequent guest, a species that occupies the extreme margins of Andamanese records. It is a creature of blunt-force utility, dominated by a massive, blocky skull that houses the tremendous jaw pressure required to splinter the calcified armor of horseshoe crabs and heavy-shelled whelks.

It bypasses the high-traffic nesting beaches of Galathea's Leatherbacks, patrolling the bathymetric drops of the Nicobars' deep-water trenches. A sighting in these churning channels is a rare win for researchers, signaling that the archipelago's most demanding ecological rungs - those requiring a specialized, shell-crushing heavy - remain occupied.

Dolphins

The waters of the Andaman and Nicobar archipelago serve as a dense, liquid conductor for sound, an acoustic environment where communication travels four times faster than in the atmosphere. This is the primary domain of the Indo-Pacific Bottlenose Dolphin (*Tursiops aduncus*), a lean, grey hunter that patrols the reef edges of Havelock and the deep trenches of the Ritchie's Archipelago. These animals are salt-hardened strategists. Their skin often bears

the white, linear scars of encounters with reef sharks, a physical record of the daily caloric struggle within the tropical food chain.

The Bottlenose dolphins here have developed specific regional tactics, utilizing the sudden bathymetric drops of the sea floor to corral schools of mackerel and sardines against the reef walls. They operate via a complex lexicon of signature whistles and high-frequency clicks. Their biosonar is so refined it can detect the density of a single fish through a meter of sediment. In the context of the Great Nicobar Project, this high-precision biological equipment is under direct threat from "acoustic fog." The low-frequency thrum of massive 20,000-TEU container ships and the seismic shocks of underwater pile-driving for the Galathea Bay terminal create a wall of white noise. For a dolphin, this is the equivalent of a human living in a world of constant, blinding light and deafening static, effectively neutralizing their ability to hunt or navigate.

In the murky, brackish interfaces of the mangrove creeks near Nancowry and the southern reaches of Great Nicobar, the Irrawaddy Dolphin (*Orcaella brevirostris*) occupies a more cryptic niche. Lacking the prominent beak of the Bottlenose, the Irrawaddy possesses a blunt, rounded head and a flexible neck that allows it to scan the tangled roots of the *Rhizophora* forests. They are famously "spitters," observed expelling jets of water to stun prey in the shallows. These dolphins are indicators of estuarine health. The dredging required for the transshipment port will release millions of tons of trapped anaerobic silt into the water column. This sediment will not only suffocate the seagrass nurseries but will physically clog the blowholes and acoustic sensors of the Irrawaddy, forcing them out of their sheltered creeks and into the high-energy, predator-heavy open sea.

Further offshore, where the continental shelf falls away into the blue-black depths of the Andaman Sea, the Spinner Dolphin (*Stenella longirostris*) moves in massive pods that can number in the hundreds. These are the athletes of the deep. Their name refers to their unique behavior of leaping from the water and spinning up to seven times in a single jump. While often viewed as a performance for tourists near Chidiya Tapu, this spinning is a vital social signal and a method for dislodging remoras and parasites. Spinners are deep-water specialists, hunting squid and pelagic fish at night. The industrialization of the Great Nicobar coastline introduces the risk of ship strikes and entanglement in large-scale commercial fishing gear, a fate that awaits many of the juvenile spinners as shipping lanes are redirected through their traditional calving grounds.

The Dugong (Dugong dugon)

The Dugong, or "Sea Cow," is the official state animal of the Andaman and Nicobar Islands, yet it exists on the absolute razor’s edge of local extinction. It is a slow-moving, strictly herbivorous marine mammal that can reach three meters in length and weigh over 400 kilograms. Unlike the dolphins, the Dugong is a creature of the seabed, a dedicated grazer of seagrass meadows.

Biological Vulnerability

The Dugong is a biological conservative. It has a low reproductive rate, with females only reaching sexual maturity after a decade and producing a single calf every three to seven years. Its survival is tied entirely to the availability of healthy seagrass beds, particularly those composed of *Halophila* and *Halodule* species. These underwater pastures must be pristine; if the water becomes too turbid due to runoff or dredging, the seagrass dies, and the Dugong starves.

In the Andamans, the primary remaining populations are found in the Ritchie's Archipelago and parts of Little Andaman. In the Nicobars, they are increasingly rare. The Great Nicobar Project involves the reclamation of hundreds of hectares of coastal land, which will lead to the direct burial of seagrass meadows. Furthermore, the Dugong is a "sight and sound" grazer. The vibration of heavy machinery and the increased presence of high-speed motorboats lead to "flight responses" that burn through their limited energy reserves, often leading to calves being separated from their mothers in the panic.

The Ghost of the Grass

To see a Dugong in the wild is to witness a ghost. They are incredibly shy, surfacing only for a few seconds to breathe through nostrils positioned on the top of their fleshy, horseshoe-shaped snouts. They use their sensitive, bristled upper lips to root out seagrass rhizomes from the sand, acting as ecological engineers that maintain the diversity of the seabed. When a Dugong is lost, the seagrass bed begins to transition into a monoculture, losing its ability to support the juvenile fish and crustaceans that the local Nicobarese communities depend on for their protein. The death of the Dugong is the precursor to the death of the artisanal fishery.

Marine Invertebrates and the "Silent Foundation"

While the charismatic megafauna receive the majority of the conservation focus, the ecological integrity of the islands is held together by a massive, largely invisible workforce of invertebrates. These organisms provide the nutrient cycling and structural maintenance required for the survival of the turtles and dolphins.

Anemones

Nestled within the surge zones are the Sea Anemones, predatory animals masquerading as soft flora. Their tentacles are packed with nematocysts - microscopic, venom-filled harpoons that fire upon physical contact. In a biological paradox common throughout the Andaman archipelago, these stinging cells provide a fortress for the Anemonefish (*Amphiprioninae*). The Magnificent Sea Anemone (*Heteractis magnifica*), often seen here with a striking purple or lime-green base, shares a purely transactional relationship with its residents: the fish find sanctuary within the venomous folds, while the anemone benefits from the nitrogen-rich waste of the fish and protection against polyp-eating butterflyfish.

Giant Clams (*Tridacna gigas*)

In the shallow reef flats of Jolly Buoy and the Button Islands, the Giant Clam acts as a living water filtration plant. These bivalves can live for over a century, their mantles displaying vivid, iridescent patterns of blue, green, and gold. These colors are not for display; they are a result of symbiotic algae (*zooxanthellae*) living within the clam's tissues. The clam provides the algae with a protected environment and the byproducts of its respiration, while the algae provide the clam with sugars produced through photosynthesis.

A single adult Giant Clam can filter hundreds of liters of water per day, removing excess nutrients and particulate matter, thereby keeping the water clear enough for sunlight to reach the corals. In the Great Nicobar development area, these clams are particularly susceptible to "siltation stress." When dredging sediment settles on their mantles, it blocks the light required for their symbiotic algae. The clams respond by closing their shells, but they cannot remain closed indefinitely. Eventually, they starve or suffocate, and with their death, the reef loses one of its most potent biological filters.

Sea Cucumbers (Holothuroidea)

Often referred to as the "vacuum cleaners of the ocean," sea cucumbers are the unsung heroes of the Andamanese sediment. They ingest massive quantities of sand and organic detritus, digesting the bacteria and algae, and then excreting "cleaned" sand. This process, known as bioturbation, prevents the seabed from becoming anoxic and acidic.

They are also vital for the chemistry of the reef. Sea cucumbers excrete calcium carbonate as a byproduct of their digestion, which is then used by coral polyps to build their skeletons. Despite being protected under Schedule I of the Wildlife Protection Act, they face heavy poaching for the illegal "Beche-de-mer" trade. The destruction of their habitat in the Nicobars to build breakwaters and piers removes the primary processing units of the marine ecosystem. Without sea cucumbers, the sand becomes a stagnant bed of decaying organic matter, leading to the collapse of the local invertebrate food web.

Nudibranchs & Sea Slugs

These gastropods are the chemical engineers of the benthos. Unlike their shelled cousins, they rely on a complex array of biological weaponry for survival.

In the Andaman Sea, species such as the *Chromodoris quadricolor* and the various *Phyllidia* sea slugs display electric blues, warning oranges, and cautionary yellows to signal their distastefulness to potential predators. They extract nematocysts from the jellyfish and anemones they consume, repurposing these stinging cells in their own dorsal tissues. This is a microscopic war of attrition played out on the coral rubble.

Sea Stars and Sea Lilies

The *Linckia laevigata*, or Blue Sea Star, is a common sight on the reef flats, its vibrant pigment a result of a specific protein-carotenoid complex. These echinoderms are essential for maintaining the balance of algae on the reef. More delicate are the Sea Lilies and Feather Stars (Crinoids), which attach themselves to the tops of coral heads. They extend feathery arms to capture passing organic matter. Like the Fan corals, they are entirely dependent on clear, moving water.

In the stagnant, silted water that will result from the dredging of Galathea, these crinoids will be the first to die, their feathery arms becoming weighed down by mud until they can no longer feed.

Giant Clams and Octopuses

The *Tridacna* clams, some reaching over a meter in length, are living filters. They have occupied the reefs of the Nicobars for millennia. They are now faced with an industrial onslaught that ignores their role in water purification. In the crevices around them, Octopuses and Cuttlefish operate as the reef's most sophisticated predators. Their ability to change skin color and texture in milliseconds is a biological miracle. However, camouflage is useless against a backhoe. The physical destruction of the reef substrate removes the holes and caves these cephalopods require for nesting and protection.

Deep within the Andamanese reefs, the heavy-valved *Tridacna* and the fluid, shadow-shifting octopuses occupy a world of limestone crevices now threatened by a deluge of industrial silt.

Crustaceans and the Armored Scavengers

The crustaceans of the Andaman Sea, ranging from the microscopic copepods that form the base of the marine food web to the massive, terrestrial Coconut Crab (*Birgus latro*), are currently facing a total disruption of their calcification cycles. In the littoral zones of Great Nicobar, the Spiny Lobster (*Panulirus homarus*) utilizes the complex architecture of the reef for both protection and hunting. These lobsters do not have claws. They rely on their thick, spiked exoskeletons and their long, sensitive antennae to detect vibrations in the water.

The Coconut Crab, a species that can weigh up to four kilograms and possesses the strength to crack a coconut with its chelae, is perhaps the most iconic terrestrial invertebrate of the southern islands. They are slow-growing, taking decades to reach maturity. Their life cycle is intrinsically linked to the sea; despite being terrestrial as adults, their larvae develop in the ocean.

Sponges (*Porifera*) and the Suffocation of the Filters

If the Giant Clam is the biological factory of the reef, the sponge is its most efficient lung. These are among the simplest multicellular organisms, yet their role in nutrient cycling is unsurpassed.

In the reefs surrounding the Nicobar chain, Barrel Sponges (*Xestospongia testudinaria*) can reach sizes large enough to house a human. They pump thousands of liters of seawater through their bodies every hour, stripping out bacteria and organic carbon.

Sea Lilies and Feather Stars

Perched atop coral outcrops where the current runs fastest, Sea Lilies and Feather Stars (*Crinoids*) unfurl their skeletal, multi-branched arms. These are living fossils, morphologically unchanged for millions of years. Unlike their sessile ancestors, the Feather Stars of the Andaman Sea use tiny, claw-like cirri to unstick themselves and "crawl" or swim with a mesmerizing, rhythmic undulation to better feeding grounds.

In the nutrient-rich channels of the Mahatma Gandhi Marine National Park, they appear in jarring shades of neon yellow and deep crimson, their pinnules acting as a sophisticated mesh to sieve passing plankton from the water column.

Shark

Cruising the reef crests with a sinuous, low-drag efficiency are the apex regulators: the sharks. The Blacktip Reef Shark (*Carcharhinus melanopterus*) is the most frequent sentinel of the shallows, identifiable by the distinct charcoal smudge on its dorsal fin. These aren't the mindless killers of cinema; they are skittish, high-strung predators that rely on the Ampullae of Lorenzini - electroreceptors in their snouts - to detect the faint muscle twitches of a buried crustacean or a wounded fish. Alongside them, the Whitetip Reef Shark (*Triaenodon obesus*) often occupies the darker crevices of the reef wall, capable of pumping water over its gills while stationary - a physiological luxury many other shark species lack.

Iconic Locations and Phenomena

Bala Reef (Little Andaman)

Bala Reef remains the ghost of the southern frontier. Positioned on the southwestern flank of Little Andaman, it exists far outside the standardized itineraries of the Port Blair tour operators. Reaching it requires a dedicated boat hire from Hut Bay, a journey of nearly two hours over open, unpredictable water where the swell can rise three meters without warning. The reef is a submerged plateau that suddenly transitions from bruised indigo to a blinding, translucent jade. Beneath the hull of a traditional wooden dongi, the reef shelf drops into a vertical abyss.

This is not an environment for the casual snorkeler. The currents are erratic, pulling toward the open Indian Ocean. Here, the corals are massive architecture. Table corals (*Acropora cytherea*) extend three meters across, providing a literal roof for schools of Red Snapper and the occasional passing Manta Ray (*Mobula birostris*). The biological density here is a relic of what the entire archipelago once looked like before the onset of mass tourism and the

subsequent warming events of 2010 and 2016. In the deeper sections of Bala, the staghorn corals form dense, impenetrable thickets that serve as a nursery for juvenile reef sharks.

Coral Gardens (Jolly Buoy and Red Skin)

In the Mahatma Gandhi Marine National Park, the Coral Gardens of Jolly Buoy and Red Skin serve as the definitive museum of the Andaman shelf. Access is strictly regulated via the Wandoor jetty, located 30 kilometers from Port Blair. The administrative process is a bottleneck of bureaucracy: permits must be obtained a day in advance, and every plastic item is counted and tagged for a security deposit. These islands are opened to the public on a rotational basis to prevent total ecosystem collapse. When Jolly Buoy is open, Red Skin is closed.

The "Gardens" are situated in shallow channels where the tidal flush is constant. The Brain Corals (*Diploria labyrinthiformis*) here are not mere stones, they are boulders the size of small vehicles, their surfaces a literal map of convoluted ridges and grooves. When the tide is at its lowest, the tips of these corals break the surface, exposing the delicate polyps to the air. The smell is thick, a heavy mix of salt and the biological scent of coral mucus. Through the glass-bottom boats, one sees the Blue Coral (*Heliopora coerulea*), which is actually an octocoral with a rigid skeleton of iron-blue aragonite. It is one of the few corals to have survived since the Cretaceous period, a living fossil now threatened by the acidification of the very water that has sheltered it for sixty-five million years.

Underwater Visibility and the Optical Void

The legendary underwater visibility of the Andaman and Nicobar Islands is a direct result of the absence of massive river systems dumping silt into the surrounding waters. In the outer reefs of Havelock or the remote stretches of North Passage Island, horizontal visibility can exceed thirty-five meters. This is an optical clarity that makes the surface of the water seemingly disappear. You are suspended in a void of high-definition blue.

This clarity is not a luxury, it is a biological mandate. Sunlight must penetrate the water column to reach the zooxanthellae living within the coral tissues for photosynthesis to occur. The proposed dredging for the transshipment port at Galathea Bay will introduce millions of tons of suspended solids into this liquid glass. The "Secchi disk" depth - the measurement of how deep light can penetrate - will collapse. When visibility drops, the light is choked out. The corals, unable to photosynthesize, will bleach and die within weeks. The gardens will become graveyards of grey limestone, smothered by a layer of industrial silt that no tide can wash away.

Forest Ecology and Terrestrial Strata

The transition from the aqueous to the terrestrial begins in the anaerobic mud of the mangrove fringes. These are the tidal forests, dominated by the *Rhizophora* and *Avicennia* genera. In regions like Baratang and the Dhaninallah Mangrove Walkway near Rangat, the stilt roots form an impenetrable lattice that functions as a mechanical barrier against cyclonic surges. The mud

here has a high sulfur content, smelling of rot and ancient brine. It is the primary nursery for the Saltwater Crocodile (*Crocodylus porosus*), which can be found in the murky channels of the Lohabarrack Sanctuary. These reptiles are apex survivors, capable of crushing an Andaman wild pig with a bite force exceeding 3,700 pounds per square inch.

The Giant Evergreen forests of the interior represent the climax of the archipelago botanical evolution. Here, the canopy reaches heights of forty to sixty meters, dominated by Dipterocarps like *Dipterocarpus grandiflorus*. Sunlight rarely touches the forest floor; what reaches the lower levels is a filtered, greenish gloom. The humidity is a physical weight, trapped by the multi-layered canopy. In these humid depths, the Andaman Padauk (*Pterocarpus dalbergioides*) reaches its maturity. This is the state tree, a massive semi-deciduous entity with buttress roots that spread like wooden fins to stabilize its enormous girth in the shallow, rocky soil. Its heartwood is a deep, prized crimson, varying in density from 700 to 900 kg/m³. It is a wood so durable it was used for the floorboards of the Cellular Jail, yet its slow growth rate makes it a non-renewable resource in any human timeframe.

Endemic Mammals

Andaman Wild Pig (*Sus scrofa andamanensis*)

Moving through the leaf litter with a frantic, localized violence is the Andaman Wild Pig. Smaller and leaner than its mainland counterparts, this endemic subspecies is a vital protein source for the indigenous Jarawa and Onge communities. It is a highly specialized omnivore, rooting for tubers and fallen fruits like those of the *Artocarpus* species. However, the pig faces a dual threat: the encroaching loss of habitat due to developmental expansion and the genetic dilution caused by interbreeding with escaped domestic swine from settler villages. In the forests surrounding the Jarawa Tribal Reserve, the "Eyes on, Hands off" policy is the only thin line preventing the introduction of porcine diseases that could decimate both the pig population and the humans who rely on them.

Nicobar Long-tailed Macaque (*Macaca fascicularis umbrosa*)

In the southern reaches of the Nicobar group, specifically Great Nicobar, Katchal, and Little Nicobar, the Long-tailed Macaque exists as a distinct, vulnerable lineage. These primates are semi-aquatic in their habits, often seen foraging for crabs in the mangrove mud, a behavior that has earned them the "crab-eating" moniker. They are highly social, living in groups of twenty to fifty individuals. The current ₹72,000 crore "Holistic Development" plan threatens to wreck the social cohesion of these groups. As 70 percent of their territories fall within the proposed construction zones for the transshipment port and the greenfield airport, the macaques face immediate displacement. Unlike other primates, they do not adapt well to secondary, degraded forests; they require the primary coastal forest canopy for their survival.

Andaman Masked Palm Civet (*Paguma larvata tytlerii*)

While the wild pig roots through the leaf litter, the Andaman Masked Palm Civet owns the canopy. This endemic carnivore is a ghost of the high branches, more often smelled than seen; it marks its territory with a heavy, musky secretion from its anal glands that hangs thick in the humid air of the Mount Harriet interior. Its "mask" - a stark white stripe running down the snout against a soot-colored face - is its primary identifier, flashing briefly in a trekker's torchlight before the animal vanishes into the lianas. A solitary hunter and forager, it balances a diet of wild figs and *Artocarpus* fruit with the opportunistic predation of roosting birds. Because it shuns secondary forests and human settlements, the civet remains a strict specialist of the primary forest, making it a silent casualty as the archipelago's old-growth canopy is thinned by developmental encroachment.

Andaman Spiny Shrew (*Crocidura andamanensis*) and Jenkin's Shrew (*Crocidura jenkinsi*)

The leaf litter of Mount Harriet National Park holds a more microscopic, desperate urgency. Here, the Andaman Spiny Shrew exists in a state of permanent, critically endangered fragility. It is a tiny insectivore, weighing between 8 and 14 grams, defined by a coat of soft grey-brown fur interspersed with stiff, spine-like guard hairs that provide a tactile defense against the damp, predatory environment. Its metabolism is a furnace; it must consume its own body weight in earthworms and leaf-litter invertebrates every twenty-four hours just to prevent cardiac collapse.

In the same high-altitude micro-habitats, Jenkin's Shrew (*Crocidura jenkinsi*) occupies an even narrower ecological niche. This shrew is a specialist of the primary forest floor, where the humidity remains constant at 80 percent or higher. Because its range is restricted to the specific topographies of South Andaman, any shift in the rainfall patterns or the clearing of the understory for tourism infrastructure acts as a localized extinction event. These shrews do not possess the ability to migrate across the developed corridors of Port Blair; they are prisoners of their own evolutionary specificity.

Nicobar Tree Shrew (*Tupaia nicobarica*)

Further south, in the primary forests of Great Nicobar and Little Nicobar, the Nicobar Tree Shrew operates within the order Scandentia, a lineage distinct from true shrews. This species is diurnal, possessing large, dark eyes and a bushy tail that gives it a squirrel-like appearance. It is a creature of high neurological complexity, with a brain-to-body mass ratio that places it closer to primates than to other small mammals. It nests in the hollows of trees, specifically favoring the *Casuarina* and *Pandanus* stands that line the coastal interiors. The Tree Shrew is an essential seed disperser for the Nicobar flora, yet it is currently threatened by the fragmented land-use changes proposed for the Great Nicobar Project. As the forest is bisected by roads, the arboreal pathways of the Tree Shrew are severed, forcing it to ground level where it is vulnerable to predation by domestic dogs and the Water Monitor Lizard.

Andaman Horseshoe Bat (*Rhinolophus cognatus famulus*)

Suspended in the humid darkness of the Alfred Caves in Diglipur and the limestone cracks of Baratang is the Andaman Horseshoe Bat. This subspecies is characterized by its complex, leaf-like nose fold, which acts as an acoustic lens for its high-frequency echolocation. With a forearm length measuring precisely between 45.2 and 48.6 mm, it is a small, specialized hunter of the forest edge. It emerges at dusk to forage for coleopterans and lepidopterans in the gap-phase openings of the evergreen canopy. The bat is hyper-sensitive to human intrusion; the heat and carbon dioxide exhaled by unauthorized spelunkers and tourists can raise the ambient temperature of a cave roost by several degrees, triggering premature arousal from torpor and leading to mass mortality in maternity colonies.

Feral Elephants of Interview Island (*Elephas maximus*)

On Interview Island, the forest ecology is shaped by a living relic of industrial failure. In the 1960s, a timber logging company, PC Ray and Co., went bankrupt and abandoned approximately forty Asian elephants on the island. Over the subsequent decades, these animals reverted to a feral state, adapting to the unique stresses of an island environment. They have developed a high tolerance for brackish water and are known to swim across the narrow channels between islands to forage for succulent vegetation.

The feral elephants of Interview Island represent a biological paradox. While they are a majestic anomaly, their presence on a 133-square-kilometer island has resulted in significant overgrazing. They strip the bark from the *Pterocymbium tinctorium* and *Sterculia* trees, preventing forest regeneration. The population has stabilized at a precarious number, but they remain a stark reminder of the long-term ecological consequences when domestic utility is discarded into a wild system.

Spotted Deer/Cheetal (*Axis axis*)

The most visible and destructive mammalian presence in the archipelago is the Spotted Deer, or Cheetal. Introduced by the British between 1906 and 1915 for sport hunting, the Cheetal found an environment entirely devoid of natural predators like tigers or leopards. In this vacuum, their population exploded. They are now an invasive force that has decimated the forest undergrowth. In areas like Ross Island and the outskirts of Mount Harriet, the "browse line" is a visible scar on the landscape - a height of approximately five feet below which all green foliage has been stripped bare. This overgrazing has led to the collapse of the seedling bank, meaning that when the ancient Dipterocarps die, there are no juveniles to replace them. The Cheetal has transformed complex, multi-layered forest floors into sterile, park-like clearings, proving that the introduction of a single "beautiful" species can be as lethal as a chainsaw to the integrity of an island's biodiversity.

Reptiles and Amphibians

The herpetological record of the Andaman and Nicobar Islands is a catalog of prehistoric endurance. In these isolated archipelagos, the reptiles have not merely survived; they have

ascended to the apex of every available niche, from the saline silt of the mangrove creeks to the high canopies of the inland evergreens.

Saltwater Crocodile (*Crocodylus porosus*)

The Saltwater Crocodile is the undisputed sovereign of the Andamanese littoral zone. Known locally as the 'saltee,' this species is the largest living reptile on Earth, with mature males in the Lohabarrack Saltwater Crocodile Sanctuary and the creeks of Little Andaman reaching lengths exceeding 5.5 meters and weighing over 1,000 kilograms. Their physiology is a masterclass in brackish water adaptation, featuring specialized lingual salt glands that excrete excess sodium, allowing them to traverse hundreds of kilometers of open ocean between island groups.

The sensory biology of *Crocodylus porosus* is defined by Integumentary Sense Organs (ISOs), small black pits located across their scales that detect minute pressure changes and vibrations in the water column. In the murky estuaries of Baratang and Havelock, this allows them to hunt in total darkness, sensing the wake of a surfacing Green Sea Turtle or the panicked splash of a wild pig. The increasing frequency of human-crocodile conflict in Port Blair is a direct result of the loss of mangrove buffer zones. As tourism infrastructure encroaches on nesting sites, the crocodiles are forced into the concrete drainage systems and public beaches, a collision of ancient instinct and modern greed.

Reticulated Python (*Malayopython reticulatus*)

In the Nicobar Islands, the Reticulated Python represents the zenith of ambush predation. This serpent is an inhabitant of the primary rainforests and mangrove edges of Great Nicobar, where the humidity facilitates its massive caloric requirements. Specimens in these islands have been recorded at lengths of 6 meters, possessing a complex, iridescent pattern of interlocking geometric shapes that provide perfect crypsis against the dappled light of the forest floor.

The python’s skull is a kinetic marvel, with a lower jaw that separates into two independent halves, allowing it to consume prey significantly wider than its own body, such as the Nicobar Wild Pig or the Crab-eating Macaque. Its heat-sensing pit organs, located along the labial scales, allow it to track the thermal signatures of endothermic prey with a precision that exceeds human infrared technology. Despite its size, the python is a vulnerable specialist; the fragmentation of the Great Nicobar forests by the proposed transshipment port will destroy the continuous canopy cover required for its thermoregulation and hunting cycles.

Water Monitor Lizard (*Varanus salvator*)

The Water Monitor Lizard is the ubiquitous scavenger of the islands, a heavy-bodied varanid that occupies the liminal space between the sea and the forest. Growing up to 2.5 meters in length, it is characterized by a long, powerful tail used for both swimming and defense. In the Andamans, *Varanus salvator* acts as a vital ecological cleaner, consuming carrion, bird eggs, and small reptiles.

These lizards are highly intelligent and opportunistic. In the vicinity of the camping sites on Smith Island, they have been observed monitoring human activity to raid discarded food. Their skin is a rugged armor of non-overlapping scales, and their forked tongues constantly sample the air for chemical cues. While they are resilient, they are currently facing a silent crisis due to the ingestion of plastic waste and the destruction of the coastal sand dunes where they excavate their nesting burrows.

Andaman Cobra (*Naja sagitifera*)

Distinct from the monocled cobra of the mainland, the Andaman Cobra is an endemic species restricted to the Andaman archipelago. It is smaller and more slender than its continental relatives, typically reaching lengths of 1.2 to 1.5 meters. Its coloration varies from a pale, sandy tan to a deep, obsidian black, often lacking the iconic 'hood mark' seen in other *Naja* species.

This cobra is a specialist of the forest floor leaf litter and the edges of paddy fields, where it hunts frogs and small rodents. Its venom is a potent cocktail of postsynaptic neurotoxins that target the respiratory centers of the prey. The Andaman Cobra is a shy, reclusive animal that avoids human contact, yet it is often killed on sight due to primal fear. Its survival is intrinsically linked to the health of the rodent populations and the preservation of the low-lying wetlands that are rapidly being filled for hotel construction.

Andaman Day Gecko (*Phelsuma andamanensis*)

The Andaman Day Gecko is a flash of emerald green against the grey bark of the coconut palms and *Terminalia* trees. Unlike most geckos, which are nocturnal and drab, this species is diurnal and vividly colored, featuring a bright green body often speckled with reddish-orange dots. It is an evolutionary outlier, as the genus *Phelsuma* is primarily located in Madagascar and the Seychelles; its presence in the Andamans is a biogeographic puzzle.

These geckos possess specialized toe pads covered in millions of microscopic hairs called setae, which utilize van der Waals forces to bond with surfaces at a molecular level. This allows them to run inverted across smooth waxy leaves while hunting for small insects and nectar. They are highly territorial, and the males will engage in aggressive displays to protect their chosen tree. Their reliance on specific high-canopy fruit and insect life makes them an indicator species for the structural integrity of the island's primary forests.

Andaman Bullfrog (*Kaloula ghoshi*)

Beneath the humid leaf litter of the South Andaman forests resides the Andaman Bullfrog. This is a secretive, burrowing amphibian that is rarely seen except during the torrential rains of the Southwest Monsoon. It is characterized by a stout, globular body and a small head, with a skin pattern of dark brown and irregular lighter patches that mimic the decaying organic matter of the forest floor.

Kaloula ghoshi is a master of subterranean survival. During the dry season, it aestivates deep in the soil, emerging only when the first heavy rains saturate the ground. They gather in ephemeral pools to breed, where the males produce a deep, resonating call that can be heard across the jungle at night. As an amphibian, its permeable skin makes it hyper-sensitive to chemical pollutants and changes in soil pH. The runoff from the increasing use of pesticides in the plantations near Wandoor poses an existential threat to this endemic burrower, whose entire life cycle depends on the purity of the Andamanese earth.

Flora and Forest Types

Andaman Padauk (*Pterocarpus dalbergioides*)

The Andaman Padauk, the state tree, is a titan of the semi-deciduous forests, often soaring to heights of 45 meters. Its silhouette is defined by massive, plank-like buttresses at the base, which provide structural stability in the thin, nutrient-poor tropical soils. The bark is a flaky, grey-brown, but the true value lies beneath, in the heartwood. Known as "Andaman Redwood," the timber exhibits a range of hues from a brilliant crimson to a somber, blackish-brown. This pigmentation is due to high concentrations of santalin and other pterocarpinoids.

In the height of the dry season, the Padauk sheds its foliage to conserve moisture, only to erupt in a profusion of small, fragrant yellow flowers with the arrival of the pre-monsoon showers. Historically, the extraction of Padauk drove much of the colonial economy, leading to the establishment of the Chatham Saw Mill. Today, while it remains a protected species, the Padauk faces a new threat from the rising frequency of "lightning strikes" and illegal felling in the deeper tracts of Middle Andaman. The wood is exceptionally dense, with a specific gravity that makes it resistant to both termites and the corrosive salt air of the islands.

Andaman Pyinma (*Lagerstroemia hypoleuca*)

The state flower belongs to the Andaman Pyinma, a majestic tree that dominates the moist deciduous forest belts. It is recognized by its smooth, silver-grey bark that peels in thin, papery strips, a physiological adaptation to shed epiphytes and parasitic vines. During the months of April and May, the canopy of the Pyinma transforms into a sea of lilac and soft purple blossoms. Each flower possesses six crinkled petals, resembling delicate crepe paper, which provide a vital nectar source for the islands' endemic butterflies and sunbirds.

The Pyinma is a resilient species, capable of thriving in areas with seasonal waterlogging. Its timber, though less famed than the Padauk, is highly valued for boat building and house construction due to its elasticity and durability under wet conditions. In the South Andaman districts, the encroachment of invasive weeds like *Lantana camara* is preventing the natural regeneration of Pyinma saplings, creating a demographic gap in the forest structure where old giants remain but no young successors are rising to take their place.

Tropical Evergreen Forests

The primary ecological engine of the Andaman and Nicobar archipelago is the Tropical Evergreen Forest. These are multi-layered cathedrals of biological complexity, characterized by an unbroken canopy that allows less than 1% of sunlight to reach the forest floor. The stratification is rigid: the emergent layer consists of giants like *Dipterocarpus* species, followed by a continuous main canopy at 30 meters, and a dense understory of palms, canes, and ferns. The humidity within these tracts rarely drops below 80%, creating a microclimate where the smell of geosmin and decaying organic matter is constant.

The biological density here is staggering. A single hectare can contain over 150 species of trees. The root systems are a chaotic, surface-level network, as the rapid decomposition cycle means all nutrients are concentrated in the top few centimeters of soil. The proposed "Holistic Development" of Great Nicobar threatens to clear-fell nearly 130 square kilometers of this specific forest type. This is not just a loss of trees; it is the destruction of a hydrological pump that regulates the rainfall patterns for the entire southern group of islands. Once these ancient evergreens are removed, the thin topsoil will be washed into the sea by the first monsoon, leaving behind a sterile, sun-bleached wasteland of clay.

Mangrove Forests

The shoreline of the islands is armored by the most extensive and diverse Mangrove Forests in India. These are the "Walking Trees," primarily composed of *Rhizophora mucronata* with its iconic stilt roots and *Avicennia marina* with its upright, snorkel-like pneumatophores. These forests are a saline-tolerant barricade that separates the terrestrial jungle from the reef. The water within the mangrove creeks is a tea-colored soup of tannins and detritus, serving as the primary nursery for 70% of the islands' commercial fish and crustacean species.

Mangroves are masters of chemical management. They filter heavy metals from land runoff and sequester carbon at rates five times higher than terrestrial forests. During the 2004 Tsunami, areas protected by dense mangrove belts saw significantly lower mortality rates, as the complex root systems absorbed the kinetic energy of the waves. Despite this, they are viewed as "wastelands" by industrial planners. The dredging required for the transshipment port in Galathea Bay will release massive plumes of anaerobic silt, which will coat the aerial roots of the mangroves, effectively suffocating the trees by blocking their oxygen intake. The death of the mangroves is the death of the coast; without them, the shoreline will crumble, and the saltwater crocodiles will lose the murky sanctuary they have inhabited for millennia.

Conclusion

In the Galápagos, every square inch of volcanic rock is treated as a sacred repository of evolutionary data. Ecuador restricts foot traffic to specific, state-monitored paths, and the Darwin Research Station acts as a gatekeeper against the invasive and the industrial. In Costa Rica, the "Pura Vida" ethos is backed by a legal framework that pays landowners for environmental

services, recognizing that a standing forest is more valuable to the long-term GDP than a temporary slab of cattle pasture. These nations have realized that their biological assets are not just aesthetic. They are finite, non-renewable, and provide a sovereign wealth that no transshipment port can replicate.

The survival of this archipelago cannot be outsourced to a policy paper or a distant ministry; it rests in the collective grit of those who refuse to see our biological vault liquidated for a balance sheet. To save the Andamans is to reject the myth that progress requires the death of the wild - it is a fight for every acre of canopy and every pulse of the tide. If we do not act as the final line of defense against the concrete pouring over Great Nicobar, we aren't just witnesses to the destruction; we are its silent accomplices. The choice is ours: stand for the emerald, or settle for the ash.

The Andaman and Nicobar Islands represent a similar biological vault, yet the current trajectory suggests a reckless abandonment of this model. The proposed infrastructure surge in Great Nicobar ignores the hard-won lessons of the Global South. We are inviting the very industrial cannibalism that places like the Seychelles are spending billions to reverse.